AMENDMENTS TO THE CLAIMS:

Please amend claims 1, 4, 7, 10 and 15 as shown on the following pages. Material inserted is indicated by underlining (insertion) and material deleted is indicated by strike-out (deletion).
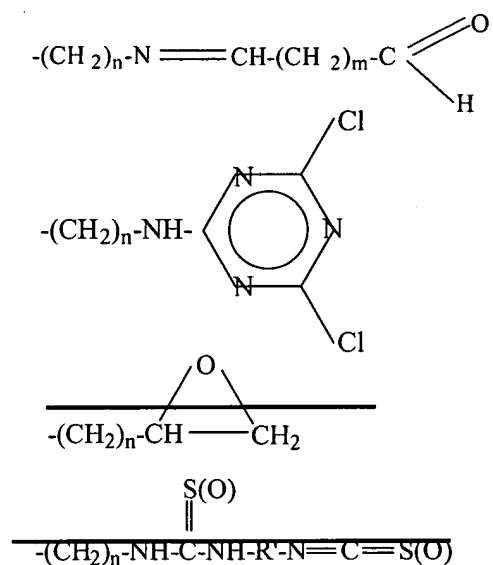
1.   (Currently Amended) A method for covalently immobilizing biopolymers on a solid phase comprising the steps of:

   (a)   preparing a solid phase selected from metallic solid phases, oxidic solid phases and metallic-oxidic solid phases which contains groups on at least part of its surface which can react with amino groups and are selected from halogenide, and aldehyde, and epoxide groups,

   (b)   preparing a biopolymer with a reactive amino group and

   (c)   covalently immobilizing the biopolymer on the solid phase.

2.   (Previously Presented) Method as claimed in claim 1, characterized in that the groups on the solid phase that can react with amino groups are selected from arylhalogenide, and aldehyde groups.

3.   (Previously Presented) Method as claimed in claim 1, characterized in that the solid phase is selected from silicon, silicon dioxide, silicate glasses and silicon/silicon dioxide.

4. (Currently Amended) Method as claimed in claim 1, characterized in that the solid phase comprises a structure of the general formula (I):
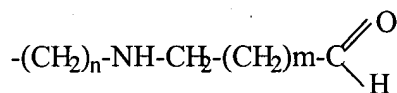
$$Z\text{-}R \qquad\qquad (I)$$

in which   Z   denotes silicon, silicon dioxide, a silicate glass or an oxidized silicon layer,

          R   denotes $(CH_2)_n\text{-}Cl$

$$-(CH_2)_n\text{-}N = CH\text{-}(CH_2)_m\text{-}C \overset{\displaystyle O}{\underset{H}{\diagdown}}$$

$$-(CH_2)_n\text{-}NH- \left\langle \text{pyrimidine ring with } N, N, N \text{ and } Cl, Cl \right\rangle$$

$$-(CH_2)_n\text{-}CH \overset{O}{\triangle} CH_2$$

$$-(CH_2)_n\text{-}NH\text{-}\overset{S(O)}{\overset{\|}{C}}\text{-}NH\text{-}R'\text{-}N = C = S(O)$$

<u>or</u>

$$-(CH_2)_n\text{-}NH\text{-}CH_2\text{-}(CH_2)m\text{-}C \overset{\displaystyle O}{\underset{H}{\diagdown}}$$
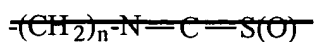
<u>or</u>

$$\cancel{-(CH_2)_n\text{-}N = C = S(O)}$$

~~R' denotes an alkylene or arylene residue, in particular a 1,4-phenylene residue and~~ n and m each denote a positive integer preferably from 1-20.

5. (Previously Presented) Method as claimed in claim 1, characterized in that the

biopolymers are selected from nucleic acids and nucleic acid analogues.

6. (Original) Method as claimed in claim 5, characterized in that amino-modified nucleic

acids or nucleic acid analogues having a structure of the general formula (II) are used

$$R^1\text{-NH-X-NA} \qquad\qquad (II)$$
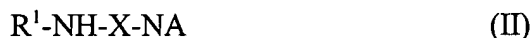
in which

R^1 denotes hydrogen or a C_1-C_6 alkyl group,

NA denotes a nucleic acid in particular a DNA or an oligonucleotide, or a nucleic acid

analogue,

X denotes a chemical bond or a linker group and X is linked to the 5' or/and 3' terminal

building block of NA.

7. (Currently Amended) <u>A method for covalently immobilizing biopolymers on a solid</u>

<u>phase comprising the steps of:</u>

(a) <u>preparing a solid phase selected from metallic solid phases, oxidic solid phases</u>

<u>and metallic-oxidic solid phases which contains groups on at least part of its</u>

<u>surface which can react with amino groups and are selected from halogenide, and</u>

<u>aldehyde, and epoxide groups,</u>

(b) <u>preparing a biopolymer with a reactive amino group and</u>

(c) <u>covalently immobilizing the biopolymer on the solid phase,</u>

<u>wherein the biopolymers are selected from amino-modified nucleic acids or nucleic acid</u>

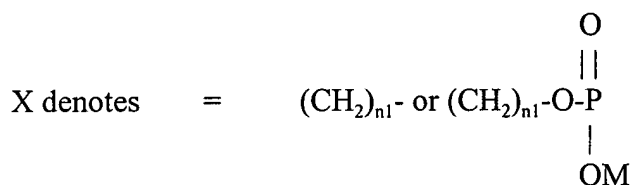analogues having a structure of the general formula (II) are used

$$R^1\text{-NH-X-NA} \qquad (II)$$

in which

R^1 denotes hydrogen or a C_1-C_6 alkyl group,

NA denotes a nucleic acid in particular a DNA or an oligonucleotide, or a nucleic acid

analogue,

X denotes a chemical bond or a linker group, and wherein ~~Method as claimed in claim 6,~~

~~characterized in that NA is a nucleic acid and~~ the group R1NH-X is linked to NA via the

5' C atom of the 5' terminal sugar residue which is in particular a deoxyribose residue.

8.   (Previously Presented) Method as claimed in claim 6, characterized in that

$$X \text{ denotes} \quad = \quad (CH_2)_{n1}\text{- or } (CH_2)_{n1}\text{-O-}\overset{\displaystyle O}{\underset{\displaystyle OM}{\overset{\displaystyle \|}{P}}}$$

in which

n1 denotes a positive integer or 0, in particular from 1 to 20 e.g. 3, 6 or 12 and

M denotes hydrogen or a cation.

9.   (Previously Presented) A method for covalently immobilizing biopolymers on a solid

phase comprising the steps of:

(a)   preparing a solid phase selected from metallic solid phases, oxidic solid phases

and metallic-oxidic solid phases which contains groups on at least part of its surface which can react with amino groups and are selected from halogenide, aldehyde, epoxide, isocyanate and isothiocyanate groups,

(b)   preparing a biopolymer with a reactive amino group and

(c)   covalently immobilizing the biopolymer on the solid phase,

wherein the biopolymers are amino-modified nucleic acids or analogues thereof having a structure of the general formula (II) are used

$$R^1\text{-NH-X-NA} \qquad (II)$$

in which

R^1 denotes hydrogen or a C_1-C_6 alkyl group,

NA denotes a nucleic acid in particular a DNA or an oligonucleotide, or a nucleic acid analogue,

X denotes a chemical bond or a linker group and X is linked to the 5' or/and 3' terminal building block of NA,

and wherein the amino modified nucleic acids are produced by enzymatic synthesis and subsequent site specific cleavage at the amino group.

10.   (Currently Amended) Method as claimed in claim 6, characterized in that after the immobilization of the biopolymer the solid phase comprises a structure of the general formula (III):
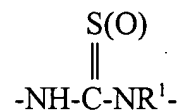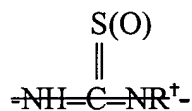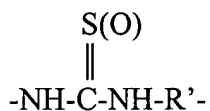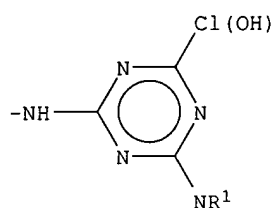
$$Z\text{-}R^2\text{-Y-X-NA}$$

in which

Z denotes a solid phase,

R^2 denotes $-(CH2)_{n2}-$,

Y denotes $-N=CH-(CH_2)_m-CH=-$,

         $-NH-CH_2-(CH_2)_m-CH_2-NR^1$,

         $-NR^1$,

or

$$\underset{-NH-C-NH-R'-}{\overset{\displaystyle S(O)}{\overset{\|}{}}} \qquad \underset{\cancel{-NH=C=NR^\dagger-}}{\overset{\displaystyle S(O)}{\overset{\|}{}}} \qquad \underset{-NH-C-NR^1-}{\overset{\displaystyle S(O)}{\overset{\|}{}}}$$

$$\underset{-CH-CH2-NR^1-}{\overset{\displaystyle OH}{\overset{|}{}}}$$
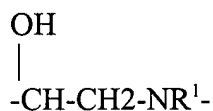
R'denotes an alkylene or arylene residue, in particular a 1,4 phenylene residue,

$R^\dagger$,

~~NA, and~~

~~X are defined as in claim 6,~~

n2 denotes a positive integer or 0, in particular from 1 to 20 e.g. 1, 3, 6 or 12 and

m denotes a positive integer preferably from 1 to 20.

11.   (Previously Presented) Method as claimed in claim 1, characterized in that biopolymers

are applied to the solid phase in an array structure.

12.   (Previously Presented) Method as claimed in claim 1, characterized in that the

biopolymers are applied by microinjection pipettes.

13.   (Original) Solid phase with immobilized biopolymers comprising a structure of the

general formula (III) as defined in claim 10.

14.   (Original) Solid phase as claimed in claim 13, characterized in that it contains an array

structure with several different biopolymers each on separate surface areas.

15.   (Currently Amended) Solid phase as claimed in claim ~~13~~ 14, characterized in that the

individual surface areas have a diameter of about 0.5 to 10μm.

16.   (Previously Presented) A method for examining the interactions between immobilized

biopolymers and free biopolymers comprising the steps:

(a)   immobilizing biopolymers on a solid phase according to claim 1

(b)   contacting free biopolymers with the immobilized polymer

(c)   detecting an interaction of the immobilized biopolymer with the free biopolymer.

17.   (Previously Presented) The method as claimed in claim 16, characterized in that the free

biopolymers are selected from nucleic acids, nucleic acid analogues, peptidic nucleic

acids (PNA), peptides, polypeptides, lipids and carbohydrates.

18. (Previously Presented) The method as claimed in claim 16, characterized in that the immobilized biopolymers are selected from nucleic acids, nucleic acid analogues and PNA and wherein detecting an interaction with free biopolymers is based on hybridization.

19. (Previously Presented) A method of sequencing nucleic acids comprising examining interactions between immobilized biopolymers and free biopolymers according to claim 16 wherein

   (a) the immobilized biopolymers are selected from nucleic acids, nucleic acid analogues and PNA;

   (b) the free biopolymers are selected from nucleic acids, nucleic acid analogues, peptidic nucleic acids (PNA), peptides, polypeptides, lipids and carbohydrates;

   (c) the immobilized biopolymers are arranged in any array or biochip; and detecting an interaction based on hybridization, and identifying the sequence of the free biopolymer by correlating the detected interaction with nucleic acid sequences.

20. (Previously Presented) A method of determining the expression of genes comprising examining interactions between immobilized biopolymers and free biopolymers according to claim 16 wherein

   (a) the immobilized biopolymers are selected from nucleic acids, nucleic acid

analogues and PNA;

(b)   the free biopolymers are selected from nucleic acids, nucleic acid analogues, peptidic nucleic acids (PNA), peptides, polypeptides, lipids and carbohydrates; and detecting an interaction based on hybridization; and correlating the detected interaction with gene expression.

21.   (Withdrawn) Device for carrying out examination of hybridization-based interactions of immobilized and free biopolymers comprising a solid phase produced as claimed in claim 1 hybridization probe, a hybridization buffer and a hybridization chamber optionally connected to a pumping device and a temperature control device.

22.   (Withdrawn) Use of the device as claimed in claim 21 in a method to detect the binding of hybridization probes to immobilized biopolymers.

23.   (Withdrawn) Use as claimed in claim 22 comprising the detachment of bound hybridization probes from the solid phase and the use of the device for further hybridization cycles.

24.   (Withdrawn) Use as claimed in claim 22, characterized in that hybridization probes are used which contain 5' amino-modified nucleotide building blocks.

25.   (Withdrawn) Use as claimed in claim 24, characterized in that bound hybridization

probes are subjected to a site-specific cleavage at the P-N bond of the 5' amino-modified

nucleotide building blocks and are then detached from the biopolymers immobilized on

the solid phase.

26.   (Withdrawn) Method for simultaneous amplification and labeling of cDNA molecules

comprising the steps:

(a) preparing RNA molecules,

(b) reversely transcribing the RNA molecules without introducing market groups into the

resulting cDNA molecules,

(c) simultaneously labelling and amplifying the cDNA molecules using labelled

deoxyribonucleoside triphosphates and

(d) optionally purifying the resulting labelled cDNA molecules.

27.   (Withdrawn) Method as claimed in claim 26, characterized in that the RNA molecules

prepared in step (a) contain a population of different RNA molecules, e.g., total RNA,

mRNA or other RNA fractions from a biological sample.

28.   (Withdrawn) Method as claimed in claim 26, characterized in that

deoxyribonucleoside triphosphates labeled with fluorescent groups which are preferably

selected from fluorescein, CY3 and CY5 are used in step (c).

29.   (Withdrawn) Method as claimed in claim 26, characterized in that 5' amino-modified
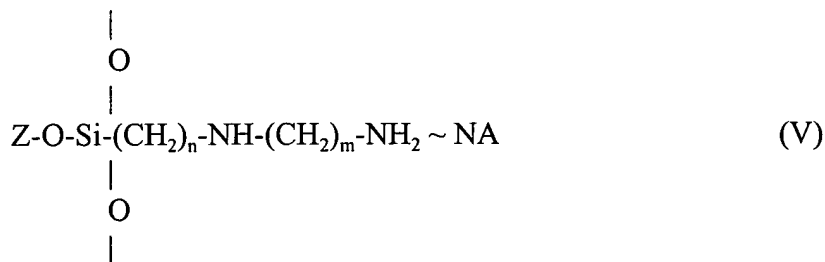
nucleotide building blocks are incorporated into the cDNA molecules during the

amplification.

30.   (Withdrawn) Method as claimed in claim 26, characterized in that at least one of the

primers used for the amplification in step (c) is a 5' amino-modified primer.

31.   (Withdrawn) Method for immobilizing biopolymers on a solid phase comprising the

steps:

(a) preparing a solid phase selected from metallic solid phases, oxidic solid phases and

metallic-oxidic solid phases which contains amino groups on at least part of its surface,

(b) preparing a biopolymer and

(c) immobilizing the biopolymer on the solid phase during which the sold phase

containing amino groups forms stable covalent or non-covalent interactions with the

biopolymer.

32.   (Withdrawn) Method as claimed in claim 31, characterized in that the amino groups of

the solid phase are produced by treating the sold phase surface with an aminosilyl

compound.

33.   (Withdrawn) Method as claimed in claim 32, characterized in that the aminosilyl

compound has a structure of the general formula IV:

$$(R^1O)_3Si-(CH_2)_nNH-(CH2)_mNH_2 \qquad\qquad (IV)$$
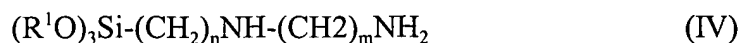
in which R_1 denotes hydrogen or a C_1-C_3 alkyl group, preferably a methyl residue and n

and m are defined as in claim 4.

34. (Withdrawn) Method as claimed in claim 33, characterized in that N-(6-aminohexyl)-

aminopropyltrimethoxysilane is used as the compound of formula IV.

35. (Withdrawn) Method as claimed in claim 31, characterized in that after immobilization

of the biopolymer the solid phase comprises a structure of the general formula (V):

$$
\begin{array}{c}
| \\
O \\
| \\
\text{Z-O-Si-(CH}_2)_n\text{-NH-(CH}_2)_m\text{-NH}_2 \sim \text{NA} \qquad\qquad \text{(V)} \\
| \\
O \\
|
\end{array}
$$

in which NA, Z, n and m represents a covalent or non-covalent interaction.

36. (Withdrawn) Method as claimed in claim 31, characterized in that the biopolymers are

applied to the solid phase in an array structure.

37. (Withdrawn) Method as claimed in claim 31, characterized in that the biopolymers are

applied by microinjection pipettes.

38. (Withdrawn) Solid phase with immobilized biopolymers comprising a structure of the

general formula (V) as defined in claim 35.

39.   (Withdrawn) Solid phase as claimed in claim 38, characterized in that it contains an array

of structure with several different biopolymers each on separate surface areas.

40.   (Withdrawn) Solid phase as claimed in claim 38, characterized in that the individual

surface areas have a diameter of about 0.5 to 10 μm.

41.   (Withdrawn) Method for separating double-stranded nucleic acids due to their base

sequence, characterized in that one of the nucleic acid strands forming the double-

stranded nucleic acid fragments contains at least one 5' amino-modified nucleotide

building block.

42.   (Withdrawn) Method as claimed in claim 41, characterized in that the separation

comprises a partial melting of the nucleic acid double-strands by a temperature gradient.

43.   (Withdrawn) Method as claimed in claim 41 for mutation analysis.

44.   (Withdrawn) Use of a solid phase produced as claimed in claim 13 to examine

interactions between the immobilized biopolymers and free biopolymers.

45.   (Withdrawn) Device for carrying out examinations of hybridization-based interaction of

immobilized and free biopolymers comprising a solid phase produced as a solid phase as

claimed in claim 14, at least one labeled hybridization probe, a hybridization buffer and a

hybridization chamber optionally connected to a pumping device and a temperature

control device.

46.   (Withdrawn) Method as characterized in that after immobilization of the biopolymer the

solid phase comprises a structure of the general formula (V):

$$| \\ O \\ | $$

Z-O-Si-(CH$_2$)n-NH-(CH$_2$)m-NH$_2$ ~ NA   (IV)

$$| \\ O \\ | $$
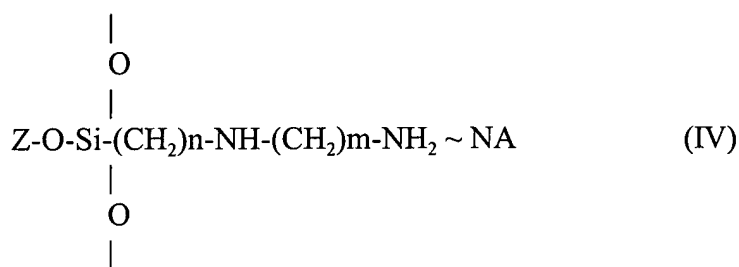
in which NA, Z, n and m are defined as claimed in claim 10 and ~ represents a covalent

or non-covalent interaction.

47.   (Previously Presented) A method of determining the function of genes comprising

examining interactions between immobilized biopolymers and free biopolymers

according to claim 16, and correlating the interaction of the free biopolymer and an

immobilized biopolymer with the function of a gene.

48.   (Previously Presented) A method of determining metabolism comprising examining the

interactions between immobilized biopolymers and free biopolymers according to claim

16, and correlating the interaction with metabolism.